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SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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07/697,830 05/09/91 HUANG

J 35441

EXAMINER

LOKE, S

ART UNIT

PAPER NUMBER

2508

2

DATE MAILED: 10/29/91

RICHARD M. SHARKANSKY  
RAYTHEON COMPANY  
PATENT DEPARTMENT  
141 SPRING STREET  
LEXINGTON, MA 02173

This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☐ Responsive to communication filed on \_\_\_\_\_ ☐ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), \_\_\_\_\_ days from the date of this letter.  
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

**Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:**

- |   |  |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited by Examiner, PTO-892. | 2. <input checked="" type="checkbox"/> Notice re Patent Drawing, PTO-948.        |
| 3. <input type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449.                 | 4. <input type="checkbox"/> Notice of Informal Patent Application, Form PTO-152. |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474.     | 6. <input type="checkbox"/> _____  |

**Part II SUMMARY OF ACTION**

1. ☒ Claims 1-6 are pending in the application.

Of the above, claims \_\_\_\_\_ are withdrawn from consideration.

2. ☐ Claims \_\_\_\_\_ have been cancelled.

3. ☐ Claims \_\_\_\_\_ are allowed.

4. ☒ Claims 1-6 are rejected.

5. ☐ Claims \_\_\_\_\_ are objected to.

6. ☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

7. ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

8. ☐ Formal drawings are required in response to this Office action.

9. ☐ The corrected or substitute drawings have been received on \_\_\_\_\_. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable. ☐ not acceptable (see explanation or Notice re Patent Drawing, PTO-948).

10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on \_\_\_\_\_ has (have) been ☐ approved by the examiner. ☐ disapproved by the examiner (see explanation).

11. ☐ The proposed drawing correction, filed on \_\_\_\_\_, has been ☐ approved. ☐ disapproved (see explanation).

12. ☐ Acknowledgment is made of the claim for priority under U.S.C. 119. The certified copy has ☐ been received ☐ not been received  
☐ been filed in parent application, serial no. \_\_\_\_\_; filed on \_\_\_\_\_.

13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. ☐ Other

**EXAMINER'S ACTION**

The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification is objected to under 35 U.S.C. § 112, first paragraph, as the specification, as originally filed, does not provide support for the invention as is now claimed. The specification (P,18, line 12-15) and Fig.2 disclose a dopant spike layer [59] formed on the channel layer having a few angstroms thickness and having a dopant concentration. However, the specification never discloses the dopant spike layer formed inside the channel layer [20].

Claims 5-6 are rejected under 35 U.S.C. § 112, first paragraph, for the reasons set forth in the objection to the specification.

Claims 2 and 4-6 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 2, line 4, it is unclear why "a" is used after the word "material".

In claim 4, line 3, is the first charge screen layer being

referred to the 3rd portion of the charge donor layer?

In claim 5, "said charge donor layer" and "said second Group III-V material" have no antecedent basis. In line 19, what is "a/cc"?

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --  
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 3 are clear and definite, 2 and 4-6 insofar, as in compliance with 35 USC 112 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Smith et al.

Smith et al discloses a high electron mobility transistor (HFET) in fig.1. It comprises:

- (a) a GaAs substrate;
- (b) an In GaAs channel layer disposed over the substrate;
- (c) a charge donor region (1st charge screen layer) comprised of a 1st region of undoped  $\text{Al}_{0.25}\text{Ga}_{0.75}\text{AS}$  having a bandgap higher than the bandgap of the channel layer, a planar doping layer having a dopant concentration of  $5 \times 10^{12} \text{ cm}^{-2}$  Si and a n type  $\text{Al}_{0.25}\text{Ga}_{0.75}\text{AS}$
- (d) a pair of n+ GaAs contact regions disposed over the 1st charge screen layer;
- (e) a gate electrode disposed in the n type  $\text{Al}_{0.25}\text{Ga}_{0.75}\text{AS}$

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(f) a pair of source and drain electrodes contact with the n+ GaAs contact regions.

Any inquiry concerning this communication should be directed to Loke at telephone number (703) 308-4920.

Loke/dm  
October 24, 1991

*S.H.*

*Rolf Hille*  
**ROLF HILLE**  
**SUPERVISORY PATENT EXAMINER**  
**ART UNIT 258**